

**CLAIMS:**

1. A method of welding comprising the steps of:  
during welding, identifying a transition between a  
5 first mode of operation during which no spatter is produced, and a second mode of operation during which a minimal amount of spatter is produced; and  
adjusting a power supply voltage whereby welding occurs under conditions associated with said transition;  
10 whereby  
said step of identifying said transition comprises identifying near zero voltage fluctuations in said power supply voltage.
- 15 2. The method as claimed in claim 1 further comprising automatically adjusting said power supply voltage.
3. The method as claimed in any one of claims 1 or claim 2 further comprising continually adjusting said  
20 power supply voltage.
4. The method as claimed in any one of claims 1 to 3 further comprising performing a whole welding process under said conditions.
- 25 5. The method as claimed in any one of claims 1 to 4 further comprising the steps of;  
monitoring near zero power supply voltage signals during welding; and  
30 determining when an onset of near zero voltage fluctuations occurs said onset indicating a transition from said first to said second mode of operation.

6. The method as claimed in any one of claims 1 to 5 comprising a method of pulsed metal inert gas (MIG) welding.

5 7. A method of welding comprising the steps of:  
during a welding process, identifying near zero  
voltage fluctuations in a power supply voltage; and  
responsive to the detection of said fluctuations  
adjusting said power supply voltage.

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8. The method as claimed in claim 7 further comprising automatically adjusting said power supply voltage.

9. The method as claimed in claim 7 or claim 8 further  
15 comprising continually adjusting said power supply  
voltage.

10. The method as claimed in any one of claims 7 to 9 further comprising:

20 during welding adjusting power supply voltage  
responsive to variations in weld set up conditions.

11. The method as claimed in any one of claims 7 to 10  
comprising a method of pulsed metal inert gas (MIG)  
25 welding.

12. Welding apparatus for providing predetermined weld  
conditions during a welding process comprising:

30 a main electrode for forming molten metal and an arc  
between the electrode and a work target;

a power supply arranged to supply a power supply  
voltage to said electrode;

35 means for identifying a transition, during welding,  
between a first mode of operation and a second mode of  
operation; and

means for adjusting the power supply voltage whereby welding occurs under conditions associated with said transition; wherein said means for identifying a transition comprises means for identifying near zero  
5 voltage fluctuations in the power supply.

13. Apparatus constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

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14. A method substantially as hereinbefore described with reference to the accompanying drawings.

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